Fact Sheet

Energy Conservation in the Rural Home

AFS-2-3-12

United States Department of Agriculture

How to Install Insulation for the Floor and Basement

Insulate all floors in living areas over unheated spaces, including crawl spaces, unheated basements, and floors over unheated garages to a minimum value of R-11, and to R-19 in cold areas. The insulation will make your home more comfortable and will save money on your heating bills (fig. 1).

In a house with an unheated crawl space or basement, it may be wise to insulate the floor directly. However, if heating ducts are located in this space, they also should be insulated.

If a house has a crawl space, it may be more economical to insulate the crawl space walls. With this approach, less insulation will be used and ducts will not have to be insulated. However, close attention must be paid to installation of a vapor barrier on the ground and proper ventilation of the crawl space.

Houses with either heated or unheated basements also will lose heat through the portion of the foundation above ground. (Note: In mountainous areas, the entire foundation wall will lose heat due to the frost penetration.) It is a simple addition to incorporate insulation in a basement remodeling plan.

Concrete slab foundations are difficult to retrofit with insulation. Proper slab insulation should be installed during construction by placing a 2-foot-wide (0.6-meter) strip of rigid insulation around the perimeter of the slab forms and pouring the concrete over it. The best measure a homeowner can take against an existing poorly insulated slab foundation is to install a thick insulating pad under the rug.

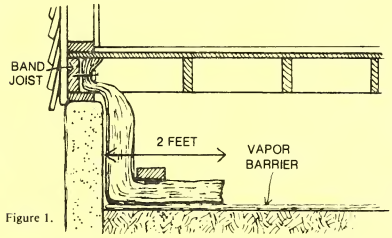

Figure 1.

Insulating Floors

Batt or blanket insulation should be installed between the floor joists, which is quite easy to do in most cases. If you are insulating over a crawl space there may be some problems with access or working room, but careful planning can make things go more smoothly and easily (fig. 2).

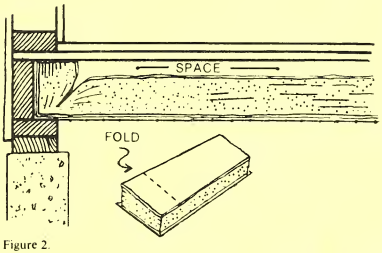

Figure 2.

Buy insulation with a vapor barrier, and install the vapor barrier facing up (next to the warm side), leaving an air space between the vapor barrier and floor. Get foil-faced insulation if possible; it will make the air space insulate better. Be sure that ends of batts fit snugly up against the bottom of the floor to prevent loss of heat. Don't block combustion air openings for furnaces.

The installer should check the floor joists spacing. This method will work best with standard 16- or 24-inch (41- or 61-centimeter) joist spacing. If the joists are spaced irregularly there will be more cutting and fitting and some wasted material.

Start with a wall at one end of the joists and work out. Staple the wire to the bottom of the joists, and at right angles to them. Slide batts in on top of the wire. Work with short sections of wire and batts so that it

[1]Consult Agriculture Fact Sheet 2-3-9, "How to Determine Your Insulation Needs," for an explanation of R factors.

won't be too difficult to get the insulation in place (fig. 3). Plan sections to begin and end at obstructions such as cross bracings.

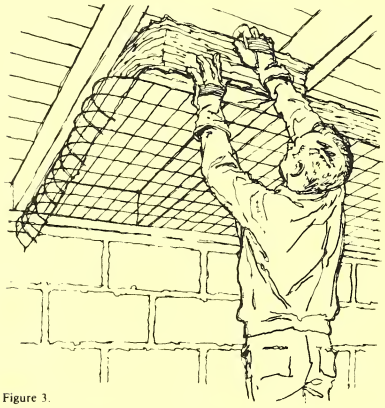

Figure 3.

Determine the area to be insulated by measuring the length and width and multiplying to get the area.

(length) × (width) = area

_____ × _____ = ___

It may be easier to divide the floor into smaller areas and add them.

(length) × (width) = area

_____ × _____ = ___

_____ × _____ = ___

_____ × _____ = ___

Total area _____ (includes joists)

(.9) × (total area), = area of insulation

.9 × _____ = _____

Total area = area of wire mesh or chicken wire

Duct Insulation

If the ducts for either the heating or the air-conditioning system run exposed through the crawl space or basement (or any other space that is not heated or cooled), they should be insulated (fig. 4). Duct insulation generally comes in blankets 1-inch or 2-inches (2.5-5 cm) thick. The thicker variety should be used, particularly with rectangular ducts. If you're doing this job at all, it's worthwhile to do it right. For air-conditioning ducts, make sure you get the kind of insulation that has a vapor barrier (the vapor barrier goes on the outside). Seal the joints of the insulation tightly with tape to avoid condensation. Check for leaks in the duct and tape them tightly before insulating.

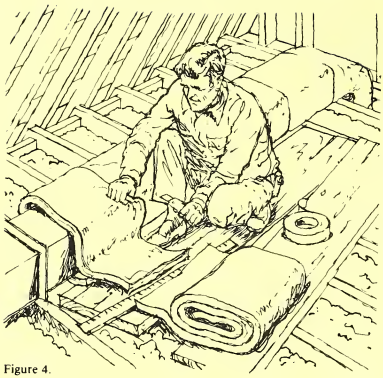

Figure 4.

Tools needed—heavy-duty shears or linoleum knife, temporary lighting with waterproof wiring and connectors, portable fan or blower to provide ventilation, tape measure, heavy-duty staple gun, and staples.

Material needed—R-11 (3"-3½") or R-19 (6"-6½") batts or blankets of rock wool or glass fiber insulation, preferably with foil facing; wire mesh or chicken wire of convenient width for handling in tight spaces.

Safety Precautions

Several safety precautions should be considered when working with glass fiber or rock wool insulation. Gloves and breathing mask should be worn to prevent contact with insulation particles. The material should be kept wrapped until ready for use.

Other safety precautions that should be observed when working in close spaces are to provide adequate temporary lighting, adequate ventilation, and to keep lights and all wires off wet ground.

Fact Sheet 2-3-12
United States Department of Agriculture
Office of Governmental and Public Affairs
Washington, D.C. 20250

Issued August 1979
Slightly revised December 1980

☆U.S. G.P.O. 1980-722-302/240